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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 09/677,870 | 10/03/2000 | Woo Hyuk Choi | 2658-0240P | 6124 |
| 2292 | 7590 | 07/14/2005 | EXAMINER | |
| BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747 | | | RUDE, TIMOTHY L | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2883 | |

DATE MAILED: 07/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/677,870

Applicant(s)

CHOI ET AL.

Examiner

Timothy L. Rude

Art Unit

2883

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-10,12,13,15-18 and 21-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-10,12,13,15-18 and 21-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims

1. Claims 1, 3-10, 12, 13, 15-18, and 21-25 are amended.

Specification and Claim Objections

2. The disclosure is objected to because of the following informalities: The specification, page 6, lines 15 and 16, refers to "applying a data signal to the pixel electrode". It is respectfully pointed out that capacitive coupling a signal and controlling a transistor to amplify or impedance match a signal is not considered the same as applying a signal to that which is driven by the transistor via the drain electrode.

Please note that application of an electrical signal requires a direct electrical connection, e.g., contact hole, pad, direct physical contact. The gate line is considered to apply a signal to the gate electrode and the data line is considered to apply a signal to the source electrode, and the transistor in turn applies a resultant signal (different signal) to the pixel electrode via the drain electrode. Portions of gate signals and data signals may also be capacitively coupled (as opposed to applied) to the pixel electrode. Please note that capacitive coupling does NOT apply the signal (the whole and unaltered signal), it merely allows an AC component of the signal to couple across an electrical insulator.

Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine

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the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. However, in this case, redefining "applying" an electrical signal would be considered repugnant to the usual meaning of the term. No term may be given a meaning repugnant to the usual meaning of the term [MPEP 608.01(o) [R-2]].

Appropriate correction is required.

Claims 1 and 10 are objected to because of the following informalities: The recitations "signal to a pixel electrode" (two places in each claim) are incorrect. Only one signal is applied to the pixel electrode, and it is applied by the drain electrode of the transistor. For examination purposes, "signal to a pixel electrode" will be considered - - signal to a thin film transistor - - .

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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3. Claims 1, 3, 5, 6, 8, 10, 12, 15, 17, and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (Kim) USPAT 6,429,909 B1 in view of Song et al (Song) USPAT 6,313,889 B1.

As to claims 1, 8, 10, 17, 21, and 23, Kim discloses in the third embodiment, Figures 6 and 7, (col. 6, line 35 through col. 7, line 5), a thin film transistor substrate in a liquid crystal display substrate comprising: a data line, 400, for applying a data signal, a gate line, 100, for applying a gate signal, and a transparent pixel electrode, 600, for driving a liquid crystal cell, repair lines, 110 and 120, (Applicant's gate dummy pattern) formed of the same material layer as the gate line (col. 6, lines 38-42 and col. 2, lines 10-17) and formed parallel to said data line, 100, and to overlap the pixel electrode, 600, and data line 400, to compensate for misalignment occurring along the data line,

Wherein the gate dummy pattern is formed to overlap [L3 and L4] with an edge portion of the pixel electrode (per Figures 6 and 7), and is separated by gate insulating layer, 200.

FIG. 6

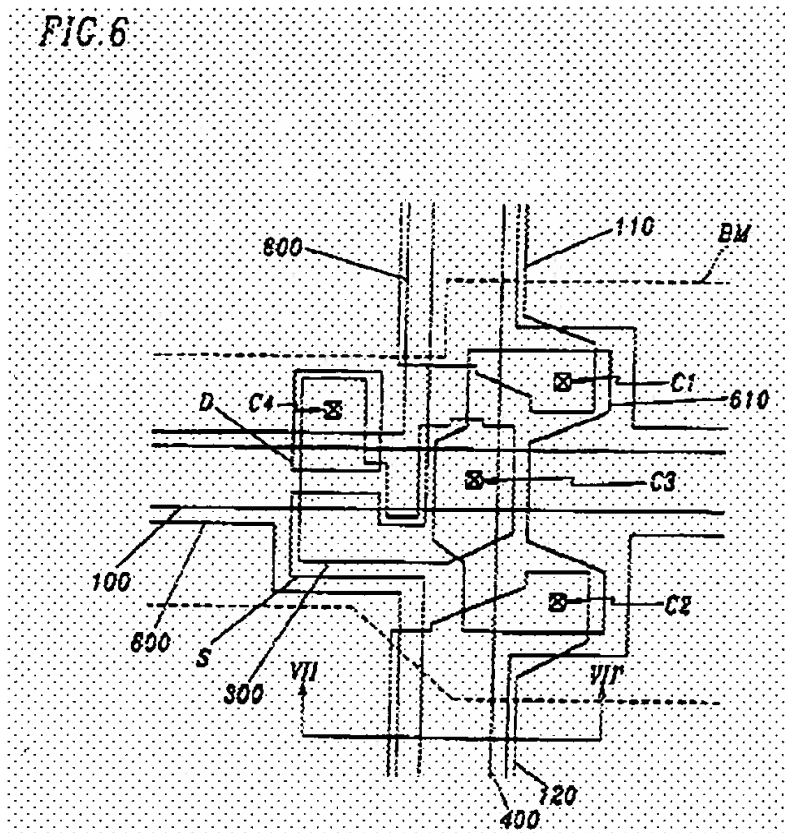
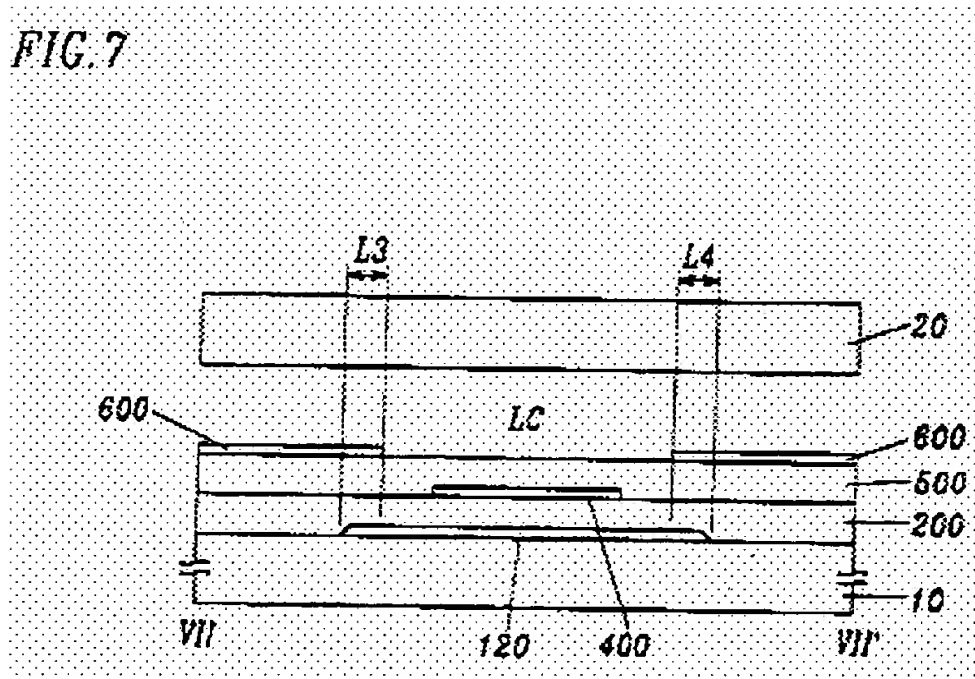


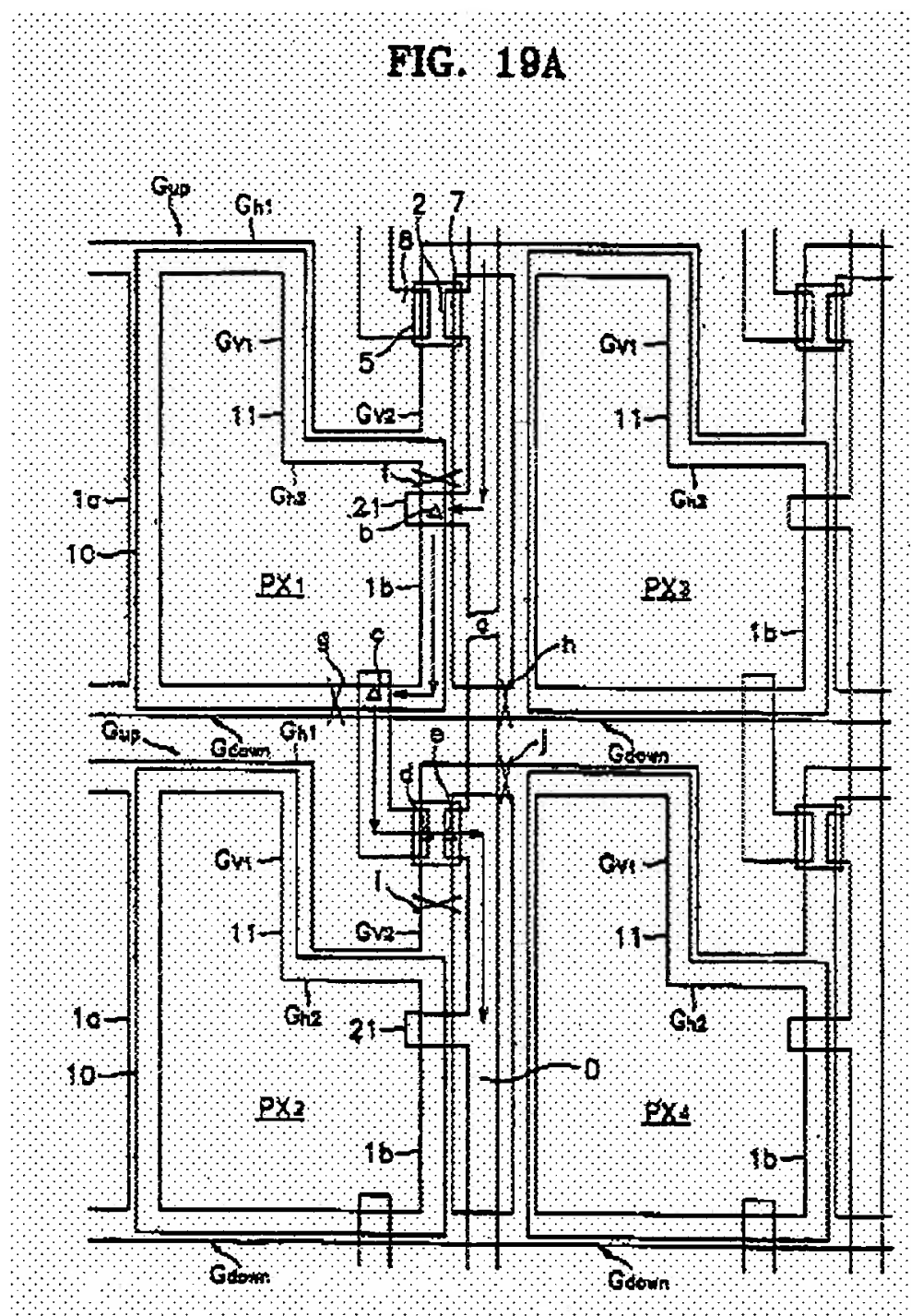
FIG. 7



Kim does not explicitly disclose 1) a display wherein the gate dummy pattern is extending from or splitting off from gate line.

Kim does not explicitly disclose 2) overlap [L3 or L4] by 0.5-1 μm .

Song teaches 1) the use of a redundant pattern that is integrated with the gate line in Figure 19A (G_{up} and G_{down} or 1a and 1b) as a redundancy electrode for electrically connecting the gate line to the broken data line (col. 17, lines 4-67, especially col. 17, lines 47-54) to effect repairs.



Song is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to form the gate dummy pattern in such a manner as

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to serve as a redundancy electrode for electrically connecting the gate line to the broken data line to effect repairs.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Kim with the redundancy electrodes for electrically connecting the gate line to the broken data line per Song.

Kim discloses 2) repair lines, 110 and 120, (Applicant's gate dummy pattern) formed of the same material layer as the gate line (col. 6, lines 38-42 and col. 2, lines 10-17) so as to extend vertically from the gate line, 100 (separated from data line, 400, by gate insulating layer, 200), and to overlap the pixel electrode, 600, and data line 400, to compensate for misalignment occurring along the data line.

Therefore the amount of overlap is an art-recognized results effective variable to compensate for misalignment occurring along the data line.

Therefore deriving the claimed range of 0.5-1 μm would take only ordinary skill in the art of liquid crystals to compensate for misalignment occurring along the data line (MPEP 2144.05 II).

Please note: in considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom [MPEP 2144.01].

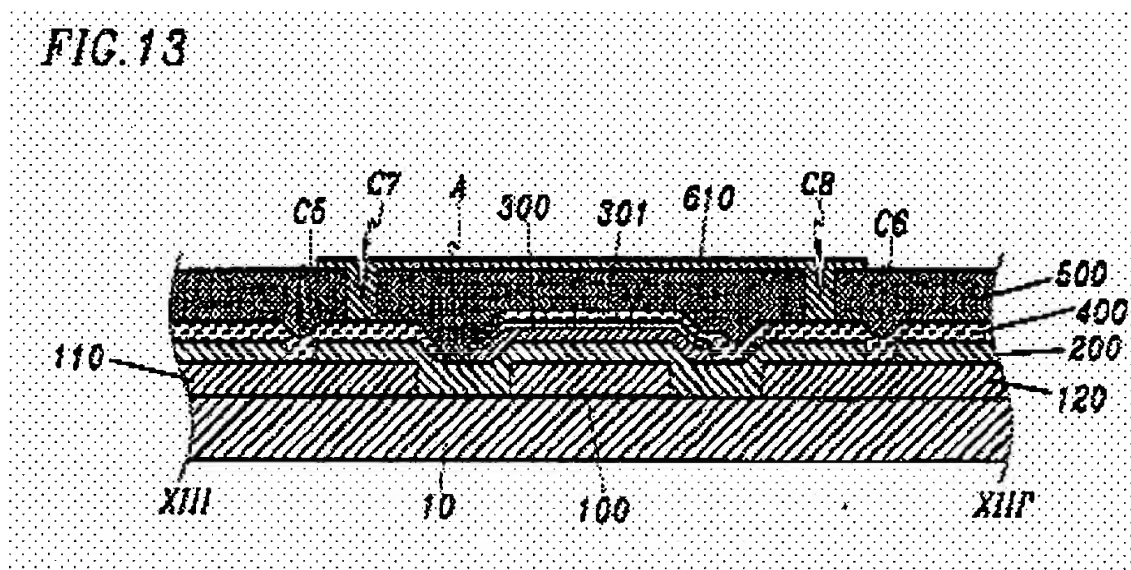
Examiner considers the applied references to adequately teach motivations and methods sufficient to lead one of ordinary skill in the art to form the claimed extensions

of the gate lines to serve as both light blocking layers and as structures available to facilitate repairs as need be.

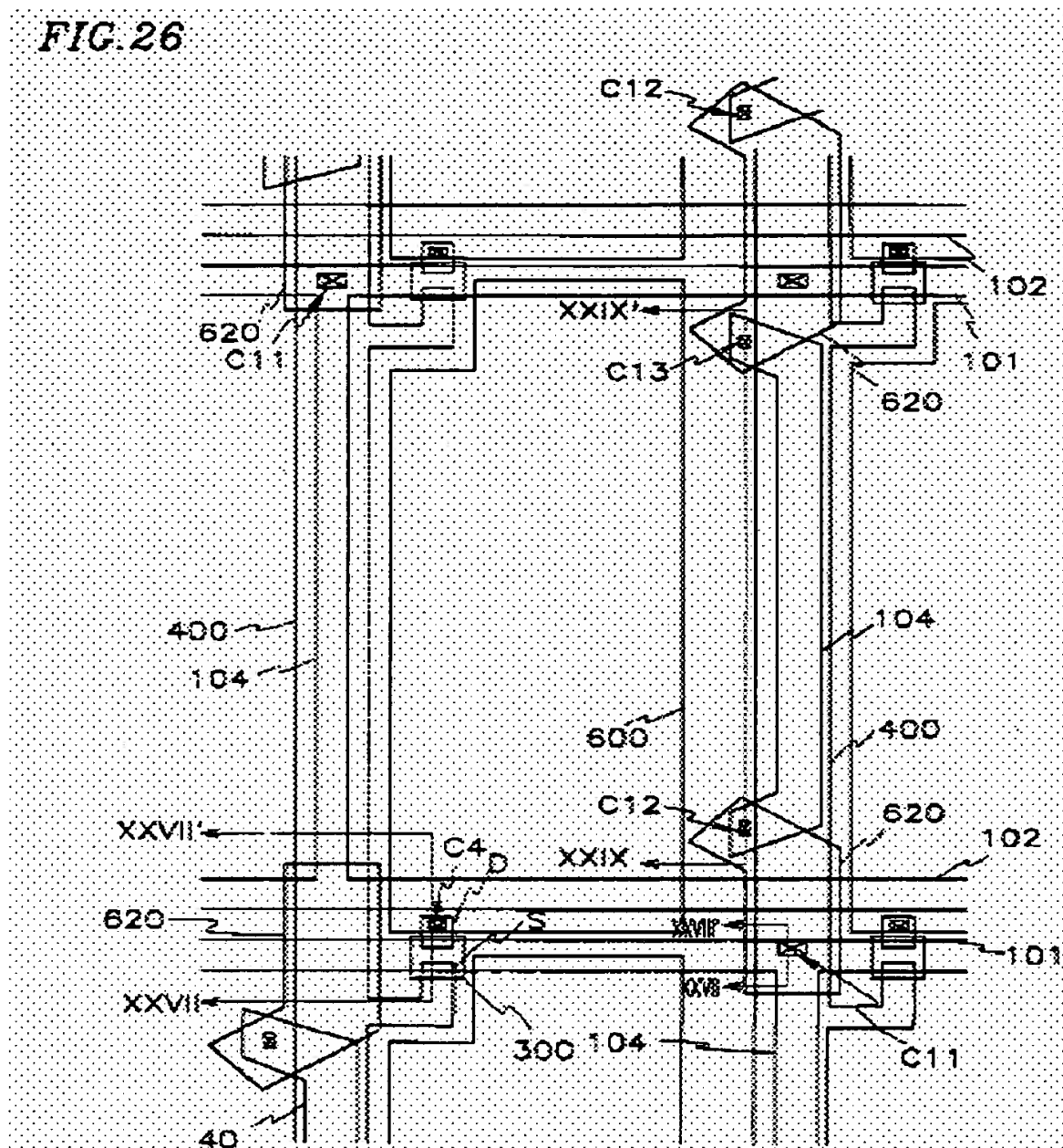
As to claim 5, Kim discloses the use of repair lines, 110 and 120, (Applicant's gate dummy pattern) as a black matrix (col. 6, lines 48-59 and col. 1, line 66 through col. 2, line 2).

As to claims 3 and 12, Kim discloses the thin film transistor substrate according to claims 1 and 2.

Kim teaches in Figure 13 wherein when the data line is broken, the use of forming holes and connections to the repair lines, 110 and 120, (Applicant's gate dummy pattern) and to a connecting pattern, 610, to repair a broken data line, 400, (col. 8, lines 1-15).



Kim teaches in Figure 26 the use of repair lines, 104, (Applicant's gate dummy pattern used as a redundancy electrode) to connect the gate line to the data line (col. 13, lines 4-17).

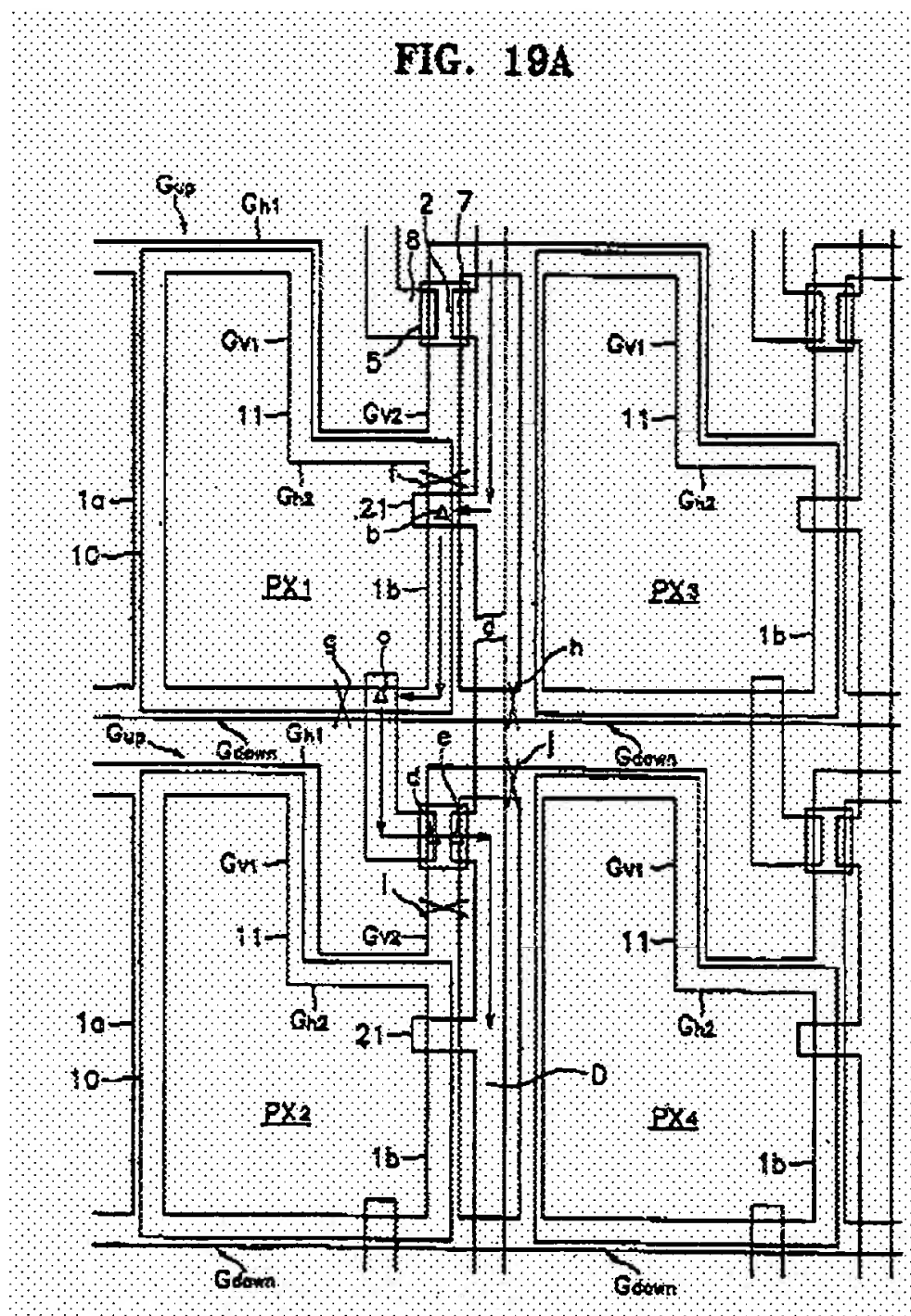


Kim is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to form holes and connect gate dummy patterns to gate lines to repair a broken data line.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Kim by forming holes and connecting gate dummy patterns to gate lines to repair a broken data line.

Also as to claims 3 and 12, Kim discloses the thin film transistor substrate according to claims 1 and 2.

Song teaches, wherein when the data line is broken, the use of a redundant pattern in Figure 19A (G_{up} and G_{down} or 1a and 1b) as a redundancy electrode for electrically connecting the broken data line (col. 17, lines 4-67, especially col. 17, lines 47-54) to effect repairs.



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Song is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to form the gate dummy pattern in such a manner as to serve as a redundancy electrode for electrically connecting the gate line to the broken data line to effect repairs.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Kim with the redundancy electrodes for electrically connecting the gate line to the broken data line per Song.

As to claims 6, 15, 22, and 24, and Song teaches in Figure 18 a thin film transistor substrate further comprising: a storage capacitor (col. 15, lines 56-64) defined by a horizontal overlapping part, G_{h2} , between the gate line and the pixel electrode, PX. Song also teaches in Figure 18 an analogous overlapping portion, 21, of the data line, D, to permit a repair. Also, any two conductors separated by an insulator result in a capacitor as a matter of physics. Therefore the overlap region between the pixel electrode and the dummy pattern which are separated by an insulator necessarily forms a capacitor.

Song is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to form the gate dummy pattern in such a manner as to form a capacitor and to include a hole connected to the gate line and formed to permit a repair.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Kim with the capacitor, dummy pattern, and hole per Song.

As to claim 25, mere duplication of parts is not patentably distinct unless unexpected results are obtained.

4. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Song as applied to claims above, and further in view of Cheng USPAT 5,657,101.

As to claim 25, Kim in view of Song discloses the display above.

Kim in view of Song does not explicitly disclose gate dummy patterns on both sides of the data line.

Cheng discloses patterns made from the gate metal layer (Applicant's first and second extension parts) on both sides of the data line in Figure 5d (col. 4, lines 26-61) to improve the aperture ratio.

Cheng is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add gate dummy patterns on both sides of the data line to improve the aperture ratio.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Kim in view of Song with the gate dummy patterns on both sides of the data line of Cheng to improve the aperture ratio.

5. Claims 4, 7, 9, 13, 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Song as applied to claims above, and further in view of Irie et al (Irie) USPAT 5,734,450.

As to claims 4, 9, 13, and 18, Kim in view of Song discloses the display above.

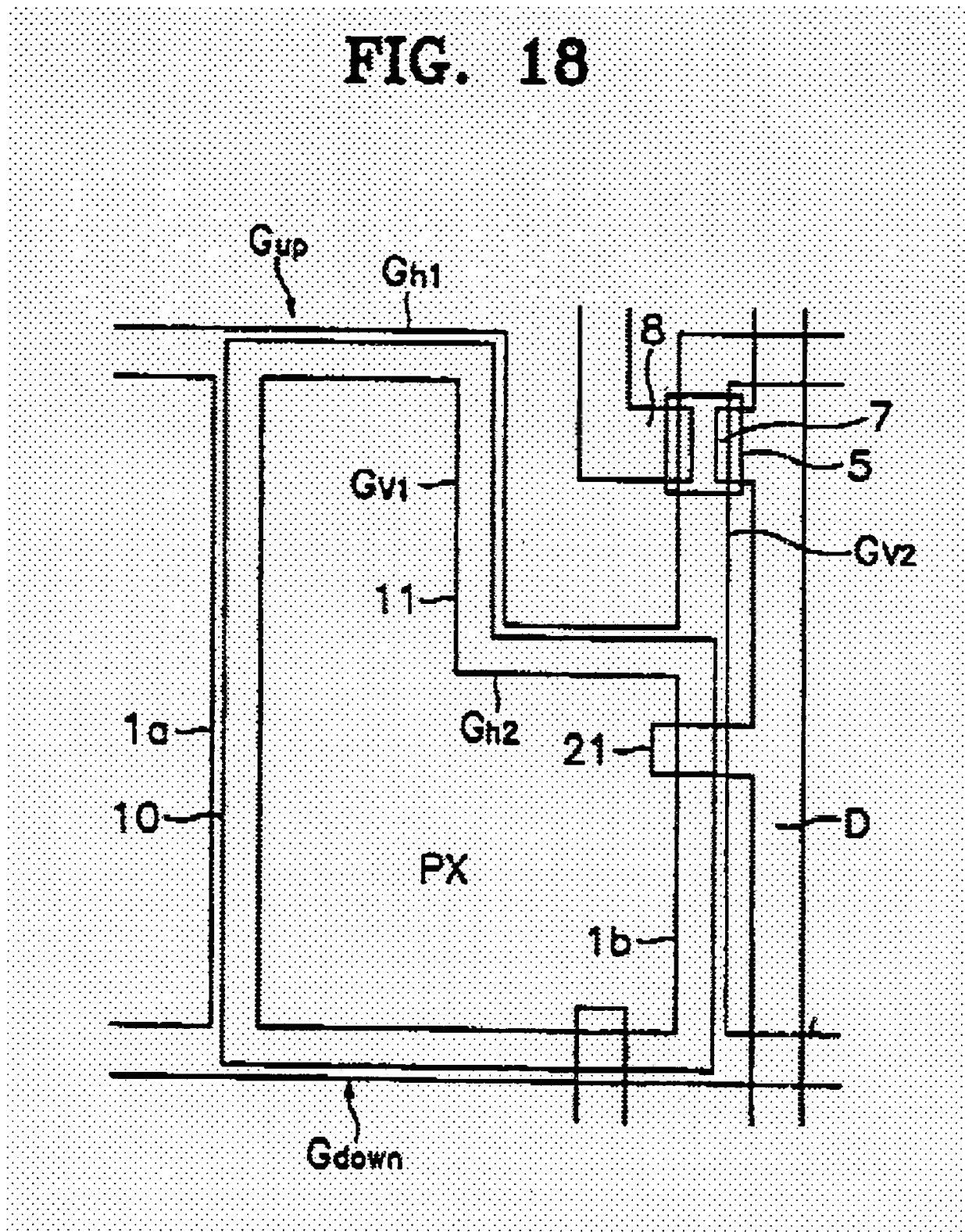
Kim in view of Song does not explicitly disclose a recess in the dummy pattern to make it easier to cut for purposes of repair, thereby disconnecting the gate dummy pattern from the gate line.

Irie teaches as prior art that a structure branching off the gate line may be made narrow (Applicant's recess), and not overlapping the data line, to facilitate laser cutting (col. 2, lines 7-20) for purposes of repair (col. 2, lines 61-67) which allows for easy correction of point defects.

Irie is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a non-overlapping recess in the gate dummy pattern to facilitate laser cutting for purposes of repair, which allows for easy correction of point defects.

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Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Kim in view of Song with the non-overlapping recess in the gate dummy pattern to facilitate laser cutting for purposes of repair, which allows for easy correction of point defects.



As to claims 7 and 16, Song teaches in Figures 18 and 19A a protrusion, 21, protruded from the data line in such a manner to overlap with the intended repair site (Applicant's recess and narrowed portion of the gate dummy patterns), the structure of which would thereby shut off a light leaked between the gate dummy pattern and the gate line (col. 15, lines 42-63). Note that in considering the disclosure of a reference, it

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is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom (MPEP 2144.01).

Song is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a protrusion in the data line, formed in such a manner to overlap with the area of the recess and narrowed portion of the gate dummy patterns, to permit a repair.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Kim with the protrusion of Song to permit a repair.

Response to Arguments

6. Applicant's arguments filed on 28 April 2005 have been fully considered but they are not persuasive.

Applicant's ONLY arguments are as follows:

(1) Applicant's specification supports application of data signal to the pixel electrode.

(2) The lines of Kim [110 and 120] are formed separately from the gate line per Kim, col. 2, lines 10-17, are not disclosed as "gate dummy patterns", and are not disconnected to effect repairs.

(3) The structure of Song is more complex, has a different circuit layout, and Kim does not say the display of Kim needs improvement, so one would not be motivated to combine.

(4) Kim's aperture ration does not need to be improved, so one would not combine Cheng.

(5) Applicant's cannot find a recess in Figure 2, so the combination would not have a protrusion over the recess and would be inoperable.

(6) Dependent claims are allowable because the independent claims are allowable.

Examiner's responses to Applicant's ONLY arguments are as follows:

(1) It is respectfully pointed that application of data signal to the pixel electrode is considered repugnant to the term per objection above, and correction is required.

(2) It is respectfully pointed that the lines of Kim are formed of the same gate line metal layer as the gate line and are separated from the gate line [Kim's separately formed] upon etching away the balance of the gate line metal layer material (most common method in the art of forming such structures) despite wording in col. 2, lines 10-17; see col. 8, lines 37-40. The structures of Kim is well known in the art to be that of "gate dummy patterns" despite terminology as used by Kim because said structures are patterned from the gate metal layer. Also, intended use is not claimed.

(3) It is respectfully pointed that adding the additional complexity of Song would obviously increase the number of possible repairs that can be made because there are

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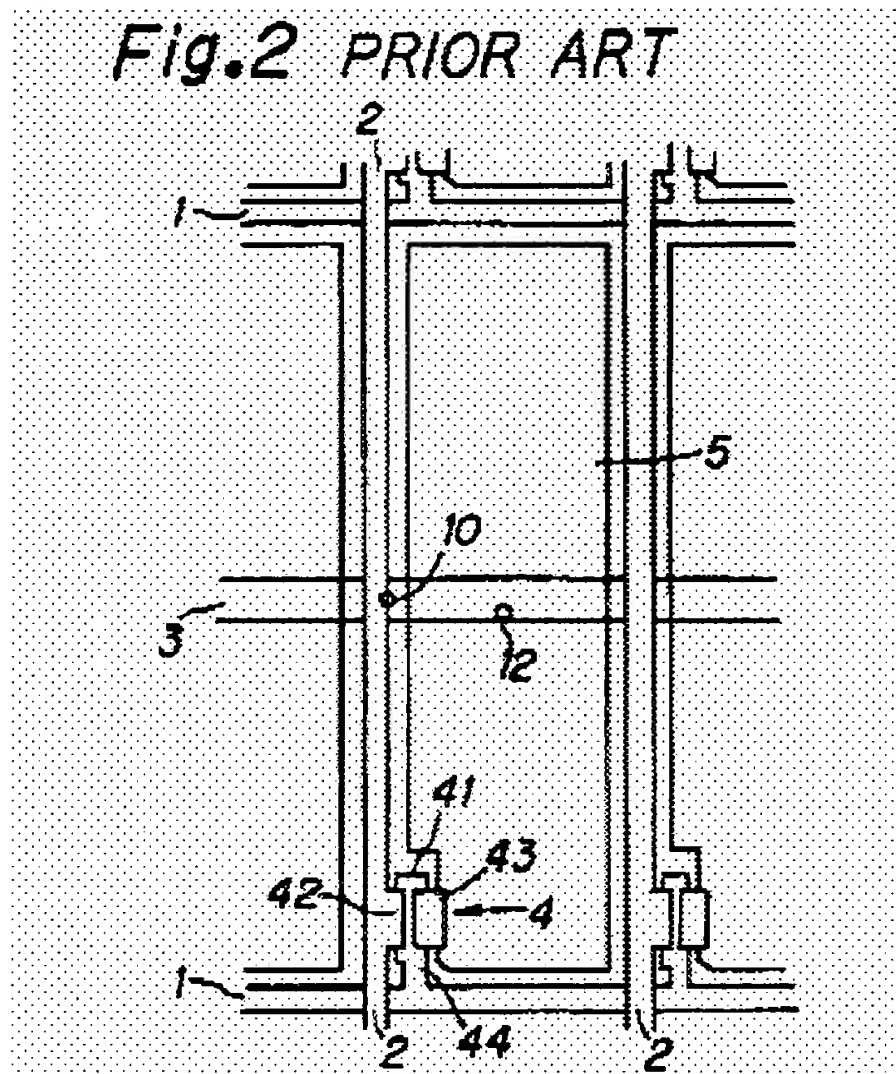
more available conductive lines to run signals in a greater number of different ways.

This is considered ample motivation to combine Song to Kim to increase the facilitation of effecting repairs per rejection above. Also, a primary reference virtually never anticipates the need for an improvement taught by the secondary reference; anything can be improved. Examiner cannot find anything that is considered to teach away.

It is also respectfully pointed that the dual gate lines of Song merely add redundancy that would not confuse one of ordinary skill in the art. Please note: in considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom [MPEP 2144.01]. Examiner considers the applied references to adequately teach motivations and methods sufficient to lead one of ordinary skill in the art to form the claimed extensions of the gate lines to serve as both light blocking layers and as structures available to increase facilitation of repairs as need be, per rejections above.

(4) It is respectfully pointed that a primary reference virtually never anticipates the need for an improvement taught by the secondary reference; anything can be improved. An aperture ratio less than infinity is less than ideal. Examiner cannot find anything that is considered to teach away.

(5) It is respectfully pointed that recess is on the left side of the narrow part, 44, that leads to the gate electrode, 41, in Figure 2 below:



The teaching of Irie would be more than sufficient to render the use of a recess obvious to one having ordinary skill in the art at the time the claimed invention was made, and as evidenced by the prior art, would not be confusing with respect to the need for light blocking layers (no teaching away). One skilled in the art does not forget fundamentals (like light blocking) when incorporating an added feature (like a recess/narrowed portion). Examiner cannot see any reason to believe one of ordinary skill in the art would be mislead into creating an inoperable device based upon the combination of applied prior art.

(6) In so far as Applicant has not argued rationale for rejection of dependent claims, Applicant has thereby acquiesced.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L. Rude whose telephone number is (571) 272-2301. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



tlr

Timothy L Rude
Examiner
Art Unit 2883



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